

WHAT IS CLAIMED IS:

- 1                   1.       A system for wirelessly activating an appliance, the appliance  
2     responding to one of a plurality of transmission schemes, the system comprising:  
3                   a transmitter operative to transmit a radio frequency activation signal  
4     based on any of the plurality of transmission schemes;  
5                   at least one user activation input, each activation input identifying a  
6     wireless channel;  
7                   a user programming input;  
8                   memory holding data describing a plurality of rolling code  
9     transmission schemes and a plurality of fixed code transmission schemes; and  
10                  control logic in communication with the transmitter, the at least one  
11     user activation input, the user programming input and the memory, the control logic  
12     implementing a rolling code programming mode, a fixed code programming mode  
13     and an operating mode;  
14                  the control logic in rolling code programming mode generating and  
15     transmitting a sequence of rolling code activation signals, each rolling code  
16     activation signal in the sequence of rolling code activation signals based on a  
17     different one of the plurality of rolling code transmission schemes, until user input  
18     indicates a successful rolling code transmission scheme, the control logic storing  
19     data specifying the successful rolling code transmission scheme associated with one  
20     of the at least one activation inputs;  
21                  the control logic in fixed code programming mode receiving a fixed  
22     code from the user programming input then generating and transmitting a sequence  
23     of fixed code activation signals, each fixed code activation signal in the sequence of  
24     fixed code activation signals based on one of the plurality of fixed code transmission  
25     schemes and each transmitting the received fixed code, until user input indicates a  
26     successful fixed code transmission scheme, the control logic storing the fixed code  
27     and data specifying the successful fixed code transmission scheme associated with  
28     one of the at least one activation inputs;  
29                  the control logic in operating mode receiving an activation input,  
30     retrieving data associated with the received activation input, and transmitting an  
31     activation signal based on the retrieved data.

1                    2.        The system of claim 1 wherein the at least one activation input  
2 is a plurality of activation inputs.

1                    3.        The system of claim 2 wherein each of the plurality of  
2 activation inputs comprises a switch and the user programming input comprises the  
3 same plurality of switches.

1                    4.        The system of claim 1 wherein the fixed code is parallelly  
2 received.

1                    5.        The system of claim 1 wherein the fixed code is serially  
2 received.

1                    6.        The system of claim 1 wherein the control logic pauses for  
2 user input after transmission of at least one fixed code activation signal in the  
3 sequence of fixed code activation signals.

1                    7.        The system of claim 1 wherein the control logic pauses for  
2 user input after transmission of at least one rolling code activation signal in the  
3 sequence of rolling code activation signals.

1                    8.        The system of claim 1 wherein membership in the transmitted  
2 sequence of fixed code signals is based on the number of bits in the received fixed  
3 code.

1                    9.        The system of claim 1 wherein the sequence of fixed code  
2 signals comprises at least one pair of fixed code activation signals based on the same  
3 fixed code transmission scheme, one fixed code activation signal in each pair based  
4 on a reversal of the fixed code.

1                    10.       The system of claim 1 wherein the sequence of fixed code  
2 signals comprises at least one pair of fixed code activation signals based on the same

3 fixed code transmission scheme, one fixed code activation signal in each pair based  
4 on an inverse of the fixed code.

1 11. The system of claim 1 wherein at least one of the sequence of  
2 fixed code signals and the sequence of rolling code signals is ordered based on a  
3 popularity of schemes, thereby reducing an average latency time until user input  
4 indicates a successful scheme.

1 12. The system of claim 1 further comprising a data port for  
2 receiving the data describing the plurality of rolling code transmission schemes and  
3 the plurality of fixed code transmission schemes.

1 13. The system of claim 1 further comprising means for  
2 modifying the data describing the plurality of rolling code transmission schemes and  
3 the plurality of fixed code transmission schemes.

1 14. The system of claim 1 further comprising a vehicle bus in  
2 communication with the control logic.

1 15. A method of activating an appliance, the appliance controlled  
2 by a radio frequency activation signal, the method comprising:  
3 if a user indicates that the appliance is activated by a rolling code  
4 activation signal, transmitting a sequence of different rolling code activation signals  
5 until the user indicates a successful rolling code transmission, then storing data  
6 representing a rolling code scheme used to generate the successful rolling code  
7 transmission;  
8 if the user indicates that the appliance is activated by a fixed code  
9 activation signal, using a fixed code word to generate and transmit each of a  
10 sequence of different fixed code activation signals until the user indicates a  
11 successful fixed code transmission, then storing data representing the fixed code  
12 word and a fixed code scheme used to generate the successful fixed code  
13 transmission; and

14                    in response to an activation input, generating and transmitting an  
15                    activation signal based on stored data.

1                    16.    The method of claim 15 further comprising storing data  
2                    representing either the rolling code scheme used to generate the successful rolling  
3                    code transmission or the fixed code word and the fixed code scheme used to  
4                    generate the successful fixed code transmission associated with one of a plurality of  
5                    activation inputs.

1                    17.    The method of claim 15 further comprising receiving the fixed  
2                    code word serially input by the user.

1                    18.    The method of claim 15 further comprising receiving the fixed  
2                    code word parallelly input by the user.

1                    19.    The method of claim 15 further comprising determining which  
2                    of a plurality of fixed code transmission schemes will be used in the sequence of  
3                    different fixed code activation signals based on a number of bits in the fixed code  
4                    word.

1                    20.    The method of claim 15 wherein the sequence of different  
2                    fixed code activation signals comprises a first signal and a second signal, the second  
3                    signal based on the same fixed code scheme as the first signal and on a reversal of  
4                    the fixed code word.

1                    21.    The method of claim 15 wherein the sequence of different  
2                    fixed code activation signals comprises a first signal and a second signal, the second  
3                    signal based on the same fixed code scheme as the first signal and on an inversion  
4                    of the fixed code word.

1                    22.    The method of claim 15 wherein at least one of the sequence  
2                    of different fixed code activation signals and the sequence of different rolling code  
3                    activation signals is ordered based on a popularity of schemes.

1                   23.     The method of claim 15 wherein the sequence of different  
2 fixed code activation signals and the sequence of rolling code activation signals are  
3 based on data held in memory, the method further comprising modifying the data.

1                   24.     A method of programming a programmable remote control,  
2 the remote control programmable to one of a plurality of appliance activation  
3 schemes, the method comprising:  
4                   receiving user type input specifying activation signal type;  
5                   if the user type input specifies variable code type, transmitting  
6 variable code activation signals until receiving user success input indicating a target  
7 appliance has been activated;  
8                   if the user type input specifies fixed code type, receiving user fixed  
9 code input providing a fixed code and transmitting fixed code activation signals until  
10 receiving user success input indicating the target appliance has been activated; and  
11                   storing information specifying an activation signal for activating the  
12 target appliance based on the received user success input.

1                   25.     The method of claim 24 further comprising receiving data  
2 specifying characteristics of at least one of the plurality of appliance activation  
3 schemes over a vehicle bus.

1                   26.     A method of programming a programmable remote control,  
2 the remote control programmable to a fixed code appliance activation scheme, the  
3 method comprising:  
4                   receiving a fixed code associated with a fixed code appliance; and  
5                   transmitting at least a first activation signal and a second activation  
6 signal, each of the first activation signal and the second activation signal based on  
7 the same fixed code activation scheme, each of the first activation signal and the  
8 second activation signal based on the received fixed code, the second activation  
9 signal based on a binary modification of the received fixed code.

1                    27.     The method of claim 26 wherein the binary modification is a  
2     bitwise reversal of the received fixed code.

1                    28.     The method of claim 26 wherein the binary modification is a  
2     bitwise inversion of the received fixed code.

1                    29.     A system for wirelessly activating an appliance, the appliance  
2     responding to one of a plurality of transmission schemes, the system comprising:  
3                    a radio frequency transmitter;  
4                    memory holding data describing the plurality of transmission  
5     schemes; and  
6                    control logic in communication with the transmitter and the memory,  
7     the control logic operative to  
8                    (a)     store a fixed code,  
9                    (b)     if a fixed code is stored, transmit a sequence of fixed code  
10                  activation schemes, based on the fixed code and data held in  
11                  the memory, until input indicating activation of the appliance  
12                  is received,  
13                  (c)     if no fixed code is stored, transmit a sequence of rolling code  
14                  activation schemes, based on data held in the memory, until  
15                  input indicating activation of the appliance is received,  
16                  (d)     store an indication as to which activation scheme activated the  
17                  appliance based on the received input indicating activation of  
18                  the appliance, and  
19                  (e)     generate an activation signal based on the stored indication  
20                  and a received activation input.

1                    30.     The system of claim 29 wherein the control logic is further  
2     operative to receive the data describing the plurality of transmission schemes and  
3     store the received data in the memory.